



Trip Around the Triangle

What can be seen in the Summer Triangle?

Where will the Kepler Mission be looking for Earth-sized planets?

About the Activity

This is a great way to organize a star party. Give visitors a context to what they will be viewing. Observe the variety of naked-eye and telescopic treats that occupy the Summer Triangle. Hand out a printed guide to your visitors for their "Trip Around the Triangle" where they can keep a record of what objects they saw.

Materials Needed

- Telescopes
- Copies of Trip Around the Triangle handout
- Pencils
- *Optional:* Stickers or small prizes



Topics Covered

- What can be seen with and without a telescope in and around the Summer Triangle asterism
- The location of the Kepler Mission's target field of view and its primary mission
- Finding the stars of a selection of constellations

Participants

Appropriate for families, the general public, and school groups ages 7 and up.

Location and Timing

This activity is perfect for use at the telescopes during a star party. The "Trip Around the Triangle" can be used for the duration of the star party, typically one or two hours.

Included in This Activity

Detailed Activity Description

Helpful Hints

Background Information

"Trip Around the Triangle" Handout



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Copies for educational purposes are permitted.

Additional astronomy activities can be found here: <http://nightsky.jpl.nasa.gov>



Set Up Instructions

Make enough copies of the "Trip Around the Triangle" handout (below) for your visitors. These should be 2-sided.

Detailed Activity Description

Trip Around the Triangle

Leader's Role	Participants' Role
<p><i>To do:</i></p> <ol style="list-style-type: none">1. Give each participating club member a copy of the handout. Explain that your visitors will have these and be on a "Trip" to look at objects on the handout. Members operating telescopes are not limited to the objects listed or just to the area surrounding the Summer Triangle. Your visitors will just be asking the operator whether or not the object being viewed is on the handout.2. One or two members may want to volunteer to point out constellations or other naked-eye objects on the "Trip".	
<p>Introduction with your visitors:</p> <p><u>To Ask:</u> Who can show me what a Triangle looks like?</p> <p><u>To Say:</u> Well, tonight you will each take a trip around a triangle – the "Summer Triangle" – as you look through our club members' telescopes tonight.</p> <p><u>To Do:</u> Hold up a copy of the handout.</p> <p><u>To Say:</u> Here are all the sights you might have a chance to see. Some you can see with just your eyes, others you'll want to find a telescope operator who can show you the object. Just ask each telescope operator what they are showing and whether it is on your trip list.</p>	<p>Participants hold their hands or arms in the form of a triangle.</p>



Leader's Role	Participants' Role
<p><i>(Optional):</i> This map might look a little complicated? Well, who can find some <i>little</i> triangles on the map? Each of those marks the location of a nebula – some are where stars might be born and some mark a dying or dead star. How about a dotted circle? Those are groups of young stars. Open star clusters. <i>(You can continue this, pointing out a few other details on the map. This helps your audience get oriented and familiar with the map. This reduces their sense of being overwhelmed.)</i></p>	<p>Nods. I can! I can see a few.</p> <p>Yes!</p>
<p><u>To Say:</u> Be sure not to miss the area where NASA's Kepler Mission will be searching for Earth-size planets around other stars. Scientists have been able to find <u>large</u> planets orbiting other stars. The challenge has been to find <u>Earth-size</u> planets. The Kepler Mission, a space-based telescope, will continuously monitor 100,000 stars in one area of the Summer Triangle for a period of four years. Hold your fist out at arm's length. The area of the sky Kepler will be monitoring for Earth-size planets is just a little larger than your fist. After it gets dark, I (or another member) can show you where that area is.</p>	<p>Hold out fists.</p>
<p><u>To Say:</u> You might want to check off each item on your Trip as you find it.</p> <p><i>(Optional):</i> After you have seen at least (three / six / pick a number) sights on the Trip, you will have earned a completion sticker. (Explain the procedure you have chosen to distribute completion stickers or other prize).</p> <p><u>To Do:</u> Pass out handouts.</p> <p><u>To Say:</u> So enjoy your Trip around the Triangle tonight!</p>	<p>Take handouts.</p>

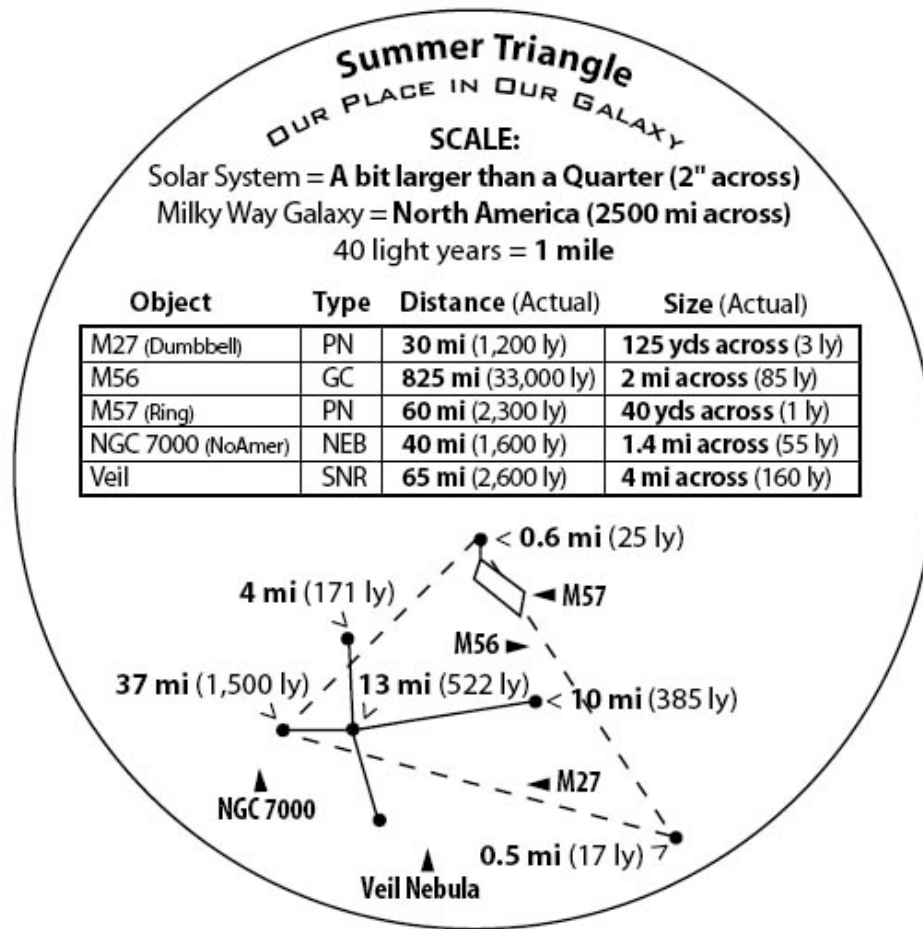


Presentation Tip:

You can use the activity "Our Place in Our Galaxy" to make a scale model of the stars in the Summer Triangle.

<http://nightsky.jpl.nasa.gov/download-search.cfm>

Look for the CD label on the Summer Triangle and make copies for the telescope operators. They can then include the scaled distances as they talk about their object at the telescope. Here is a copy of it:



Helpful Hints

The Summer Triangle is visible in the evening sky June through January and in the early morning sky February through May.

Background Information

Notes on Trip around the Triangle objects:

Gliese 777a: Star with planets (yellow subgiant – just starting to evolve off the main sequence – 52 light years away)

<http://www.extrasolar.net/startour.asp?StarCatId=normal&StarID=172>

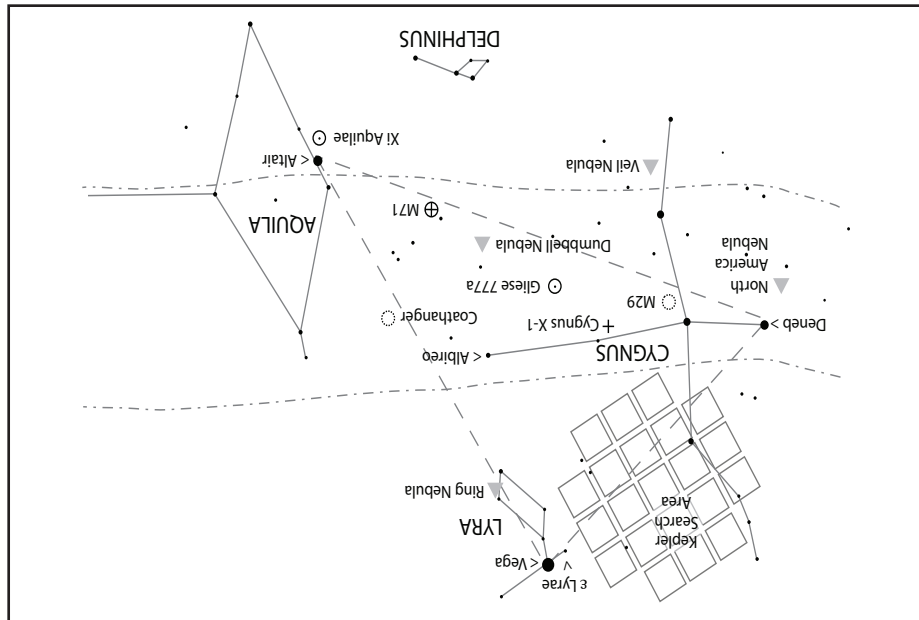
Kepler Search Area: For more information on the Kepler Mission and its target field of view:

<http://kepler.nasa.gov/sci/basis/fov.html>

To locate other objects on the handout, refer to star maps in any astronomy-related magazine or observing manual.



the Triangle



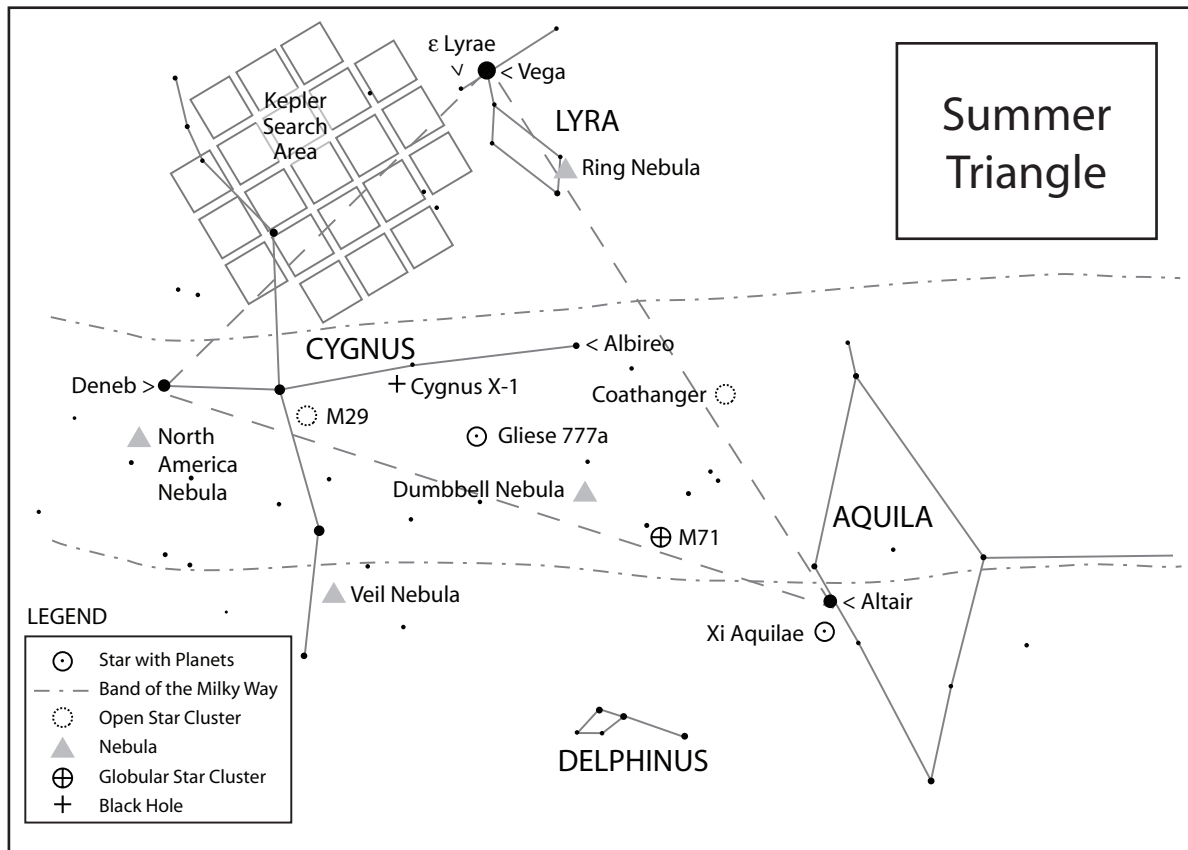
Trip Around



For more information on NASA's *Kepler Mission* to search for Earth-size planets:

<http://Kepler.NASA.gov>

What can you find in the Triangle?



Stars & Star Clusters:

Vega	<input checked="" type="checkbox"/>
Deneb	<input type="checkbox"/>
Altair	<input type="checkbox"/>
Albireo *	<input type="checkbox"/>
ε Lyrae (double-double stars)*	<input type="checkbox"/>
Gliese 777a (a star with planets)*	<input type="checkbox"/>
Xi (ksi) Aquilae (a star with planets)*	<input type="checkbox"/>
M29 (Open star cluster)*	<input type="checkbox"/>
M71 (Globular star cluster)*	<input type="checkbox"/>
Coathanger *	<input type="checkbox"/>
Cygnus X-1 (location of a black hole)	<input type="checkbox"/>

Constellations:

LYRA	<input checked="" type="checkbox"/>
CYGNUS	<input type="checkbox"/>
AQUILA	<input type="checkbox"/>
DELPHINUS	<input type="checkbox"/>

Nebulae:

Ring (planetary - dying star)*	<input checked="" type="checkbox"/>
North America (gas & dust cloud)*	<input type="checkbox"/>
Dumbbell (planetary - dying star)*	<input type="checkbox"/>
Veil (supernova remnant)*	<input type="checkbox"/>

Band of the Milky Way



Kepler Search Area

Scientists have been able to find *large* planets (similar to Jupiter) orbiting other stars. The challenge has been to find *Earth-size* planets. The *Kepler Mission's* objective is to detect planets crossing in front of their stars in order to locate planets orbiting in the habitable zone around Sun-like stars.

NASA's Kepler Mission, a space-based telescope, will continuously monitor 100,000 stars in this star field in the Summer Triangle for a period of at least four years, watching for a slight dimming of the star due to a planet crossing in front of the star. This is called a "transit."

The area of the sky Kepler will be monitoring for Earth-size planets is just a little larger than your fist held at arm's length.

* **Visible in the telescope or binoculars**
(depending on sky conditions)